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DETERMINANTS OF ELDERLY LABOR SUPPLY IN WEST NUSA TENGGARA, INDONESIA

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ABSTRACT

Elderly residents have the opportunity not to work and enjoy leisure in their retirement. However, the labor force participation rate for the elderly in West Nusa Tenggara (NTB) Province in 2017 reached 50.23 percent. Therefore, to see this potential, this study was conducted to analyze the supply of elderly workers in NTB based on demographic and social factors. The influence of demographic and social factors on the supply of labor for the elderly will be calculated based on the opportunities for the elderly to work or not work. The analysis in this study used binary logistic regression. The data is sourced from National Labor Force Survey (Sakernas) 2017. The results of the supply of elderly workers in NTB are influenced by age, education level, gender, the status of the head of the household, and the area of residence.

Keywords:
Elderly, Labor, Logistics Regression, West Nusa Tenggara

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INTRODUCTION

Indonesia has begun to enter a condition of an aging population or aging population in 2020. This is indicated by the percentage of the population aged 60 years and over which has reached 9.92 percent or 26.82 million people (BPS, 2020: 15). According to Adioetomo, et.al (2018), the percentage of Indonesian elderly is expected to reach 23 percent by 2050. Increasing life expectancy and decreasing fertility are thought to be the triggers for the aging population in a country, including Indonesia. The implication of this phenomenon is a decrease in the potential support ratio. The low carrying capacity of the elderly can encourage them to re-enter the labor market.

The phenomenon of the aging population also occurs in West Nusa Tenggara (NTB). BPS in its publication stated that the proportion of the elderly population in NTB continues to increase. In 2010 the number of elderly people reached 349.7 thousand people or 7.12 percent of the total population of the Province of NTB, then increased to 370.6 thousand people or 7.66 percent in 2015. Based on the results of the 2017 Population Projection Figures, the number of elderly people in NTB Province increased to 398.1 thousand people or 8.03 percent (BPS, 2018: 17).

Table 1. Indicators of Elderly Population in West Nusa Tenggara Province

Indicators	2010	2017
Life Expectancy Index	63,82	65,55
Number of Elderly 60+ years (thousand people)	349,7	398,1
Percentage of Elderly Population	7,12	8,03
Percentage of the Elderly Workforce	47,89	50,23
Percentage of Elderly With Health Complaints	60,29	54,81

Sources: BPS (2011, 2018)

There are several interesting facts related to the growing number of elderly groups. First, this increasing number occurs because the health level of the elderly is getting better with long life as a result of increasing welfare. This is indicated by an increase in Life Expectancy (AHP). Life expectancy based on the results of the 2010 Population Census in NTB Province is around 63.82 years, increasing to around 65.55 years in 2017. Second, the number of elderly people who are still working to earn income. The current trend is that the elderly postpone their retirement to continue working or start other careers (Mitzner et al., 2010: 1710). The elderly try to continue to participate in the labor market to meet the needs of life and meet the demands of the needs that are borne (Saputro, 2015: 37).

Data from the United Nations in 2015 shows that around 66 percent of the male elderly population is still actively working, while female elderly is only half of the proportion of men (32 percent). BPS data states that the number of elderly people who are still working or are looking for work to earn income has almost reached 50.23 percent in 2017 (BPS, 2018: 17). This means that more than half of the elderly population in NTB Province work (Table 1). The elderly residents who are still working deserve appreciation because they do not burden the productive age population. However, from another perspective, it cannot be denied that old age is a time to relax and not need to work anymore.

Based on the above background, the researcher is interested in conducting this research to know what factors influence the offer of the elderly to continue working. This research is very interesting because knowing the factors that cause the elderly population to

to decide to work, which can be used as a basis for decision making and policies related to the welfare of the elderly population in NTB Province.

LITERATURE REVIEW

In Indonesia, as stated in Law Number 13 of 1998 concerning the welfare of the elderly, it is stated that an elderly person is someone who has reached the age of 60 years and over. UNFPA also defines the elderly population in developing countries as those who have reached the age of 60 years and over (United Nations Population Fund & Help Age International, 2012). The current increase in the elderly population is the impact of the baby boom in the past few decades and this is closely related to the increase in life expectancy. This global aging population phenomenon has caused the elderly population to become workers for a longer time (Knapp & Muller, 2000; Martin, 2018). The low carrying capacity of the elderly also often encourages them to re-participate in the labor market. Adioetomo et al. (2018) mention two reasons the elderly choose to keep working, namely the first because of the necessity to meet their needs, and the second because of their own choice to self-actualize to fill their spare time. According to (Borjas, 2013), there are two things that individuals decide to join in the job market, namely the decision to participate in work or not and the decision to determine how much time is allotted to work.

Research on the characteristics of elderly workers has been carried out by many researchers, both domestically and abroad. Several socio-demographic variables related to the decision to work for the elderly include age, education, the presence of a healthy partner, and the number of household members (Radl, 2014; Sadubia & Kartika, 2014; Junaidi, et.al, 2017). Health conditions also play a role in the decision to work for the elderly, those who remain healthy in old age tend to decide to continue working rather than enjoying their retirement (Jamalludin, 2021). This is reinforced by the results of previous research (Helman et.al, 2015) that parents tend to actively seek work after retirement. Those who have good physical and mental health are also more likely to work after retirement age. This shows that there are other motivations such as the desire to socialize and continue to do activities even though they are old.

Elderly people with basic education tend to continue working at retirement age compared to those with higher education. Those with basic education are absorbed into the informal type of work that does not have a pension guarantee, so they are forced to work even though they have entered retirement age (Adioetomo et al., 2018). This result is reinforced by research from Sumarsono (2015) which states that there is a negative relationship between education and work participation of the elderly, where the elderly with higher education tend to already have good welfare from the income they work before entering old age so they have a tendency not to work. In this case, even if they have to work, they will work only for their families so they fall into the category of family/unpaid workers because they no longer need income to meet their household needs (Carrion & Nedjat-Haiem, 2013).

The results of Ananta's research (2014) when researching elderly workers in Indonesia, stated that

the low percentage of elderly working women compared to working men may be caused by several factors, two of which include social norms and education. Social norms prevailing in the surrounding environment cause more women to choose to take care of household chores, while men play the role of breadwinners. This separation of roles has occurred since the elderly were young. This is in line with the findings of previous research which stated that there was a tendency for women to leave the labor market more quickly due to the obligation to take care of household activities compared to men (Junaidi, et.al, 2017; Carr, et.al, 2018).

Sun, et.al (2011) investigated the differences in the supply of elderly workers between rural and urban areas in China and analyzed the factors that influence them, and conducted an empirical study on their income. The study found that age, retirement, and other factors have a significant impact on the labor supply of the elderly, and the impact on urban areas is much more than rural. Junaidi, et.al (2017) also found differences in the effect of elderly participation between urban and rural areas. Elderly people in rural areas are more likely to work than elderly people in urban areas. The greater possibility of the elderly working in rural areas is thought to be caused by two things. First, the level of welfare of the elderly and their families is lower in rural areas (could be due to the absence of old -age/pension insurance or the absence of savings/ investments for old age) compared to urban areas which cause the elderly to be "forced" to continue working to meet the needs of family life. Second, there are relatively more job opportunities that are easier for the elderly to enter in rural areas because they do not require certain education/skills requirements in rural areas (especially in the agricultural sector compared to job opportunities in urban areas.

METHODOLOGY

The analysis method used in this research is the descriptive analysis method and binary logistic regression. The data used in this study comes from the National Labor Force Survey (Sakernas) of BPS NTB Province in 2017. The data includes 1,125 respondents aged 60 years and over, spread across all districts/ cities in NTB Province. The variables used in the study are as follows:

Table 2. Dummy Variables

Variable Name	Notation	Description
Elderly Workforce Participation	*p*	p = 1, if the elderly enter the labor force, p = 0, if other.
Age	*age*	age = 1, if age 60 - 70 years age = 0, if age> 70 years
Education	*edu*	edu = 1, if junior high school and above edu = 0, if other
Gender	*gender*	gender = 1, if male gender = 0, if female
Household Status	*status*	status = 1, if as head of household status = 0, if other
Health Status	*health*	health = 1, if you have health complaints health = 0, if other
Marital status	*marriage*	marriage = 1, if married or divorced marriage = 0, if other
Residence Area	*urban*	urban = 1, if live in an urban area urban = 0, if other

The descriptive analysis describes the general description of the characteristics of elderly workers in NTB. While the binary logistic regression model is used because the dependent variable (elderly labor supply) has a binary scale. The binary-scale dependent variable is a variable that only has two categories, namely □ = 1 which indicates a "successful" (working) event, while for □ = 0 it indicates a "failed" (not working) event. Binary logistic regression is used to estimate the participation of elderly workers based on variables of age, education, gender, the status of the head of the household, health,

marital status, and area of residence. The models used in this research are:

$$Y_i = f(x_1, \dots, x_i) \quad (1)$$

$$y = \beta_0 + \sum_{i=1}^{n} \beta_i x_i \quad (2)$$

Where *y* is the dummy dependent variable for the work participation of the elderly and *xi* is the determinant variable for the work participation of the elderly, namely age, education level, gender, the status of the head of the household, health status, marital status, and area of residence. So that the binary logistic regression model that will be used in this study are:

$$\ln\left(\frac{1}{1-p}\right) = \beta_0 + \beta_1 age + \beta_2 edu + \beta_3 gender + \beta_4 status + \beta_5 health + \beta_6 marriage + \beta_7 urban + \varepsilon \dots\dots\dots\dots\dots\dots (3)$$

where p = 1, if the elderly enter the labor force and
p = 0, if other

To ensure that the binary logistic model is meaningful, we will first test the significance of the model either simultaneously or partially for each parameter.

FINDINGS AND DISCUSSION

Based on the latest level of education completed, around 76.06 percent of the elderly in NTB never went to school/have not graduated from elementary school, 14.70 percent have graduated from elementary school/ equivalent, 2.60 percent have graduated from junior high school/equivalent, 3.98 percent have graduated from high school/equivalent and 2,67 others graduated from higher education. What is interesting to observe here is the level of education in terms of gender. It can be seen that the level of education of elderly women is lower than that of men. This is evident from the high percentage of elderly women with education less than SD which reaches 94.81 percent and the low percentage of elderly women with SMA / equivalent education which only reaches 3.48 percent. With the sex ratio in 2017 of 88.39; This means that for every 100 elderly women there are only about 89 elderly men. Therefore, the problem of the elderly in general in the NTB region is none other than a problem that is more dominated by women.

Furthermore, when viewed from a health perspective in 2017, 54.81 percent of the elderly in NTB experienced complaints with their health, this percentage is lower than the percentage in 2016 which was recorded at 61.56 percent. The same condition can be seen in the morbidity rate for the elderly wherein 2017 was only 31.08 percent lower than in 2016 which was 58.93 percent. According to the marital status, it is recorded that around 57.74 percent of the elderly are still living with their partners, 41.24 percent of the elderly are divorced, with the proportion of 3.49 percent being divorced and 37.75 percent divorced and 1.02 percent of the other is still unmarried.

The test results simultaneously show a significance value of 0.000; This shows that at the level of confidence α = 1 percent, there is at least one independent variable that significantly affects the elderly labor supply model in NTB. However, when viewed partially, it can be seen that there is one independent variable that does not significantly affect the supply of labor for the elderly in NTB, namely the variable

marital status (Table 3).

The coefficient in logistic regression here only shows the direction of the positive or negative influence of the independent variable on the dependent variable, while the odds ratio can be interpreted as a value indicating the magnitude of the tendency for the effect of changes in the independent variable to the dependent variable. Based on the results of the study, all variables are significant to the model at the significance level α = 1 percent, except for the marital status variable, so that the elderly labor supply model in NTB can be stated in the equation:

$$\ln\left(\frac{1}{1-p}\right) = -5,865 + 0,746age - 0,648edu + 0,770gender + 0,738status + 4,289health - 0,470urban$$

There are four variables with a positive scope, namely age, gender, household status, and health status. Meanwhile, the variables with a negative scope are the level of education and the area of residence. In general, the variable that has the biggest influence on the elderly labor supply model in NTB is the health status variable.

The age variable is significant to the elderly labor supply model and has a positive relationship, so it means that the higher the age of the elderly population, the greater the probability of the individual not working. With older age, the tendency to do activities, especially work, will decrease and cause these individuals to tend to choose to retire or not work. The odds ratio value shows that an elderly person aged 60-69 years will have a greater chance of working than an elderly person aged 70 years and over. The opportunity for elderly

Table 3. Binary Logistic Regression Results

Variable	Koefisien	P-value	Odd Ratio	Marginal Effect
age	0.746	0.000	2.109	0.156
edu	-0.648	0.004	0.523	-0.129
gender	0.770	0.000	2.160	0.169
status	0.738	0.000	2.093	0.156
health	4.289	0.000	7.898	0.560
marriage	0.887	0.244		
urban	-0.471	0.000	0.624	-0.102
Constanta	-5.865	0.000		
Pseudo R-square		0.297		
Prob > chi2		0.000		
Observation		1125		

Sources: BPS (Author's Calculation)

people aged 60-69 years to work is 2.1 times greater than those aged 70 years and over. This pattern of decreasing work participation due to increasing age is in line with research conducted by Mckee (2006). According to McKee, the elderly population in Indonesia who work by opening their own business has increased their working hours until they reach 65 years of age, but after that, it began to decline. Apart from the problem of decreasing productivity levels, the increasing age of the elderly is also the higher the risk of health problems experienced, which prevents the elderly from working (Williamson & McNamara, 2001).

Educational status has a negative and significant relationship to the supply of elderly workers, meaning that the higher the education of the elderly population, the probability of working will decrease. This can be because the elderly population who have higher education are likely to have their needs met by pension funds obtained in old age. The odds ratio value shows that elderly with junior high school education and below tend to work 0.52 times greater than those with high school

education and above. In line with the results of this study, Junaidi et al. (2015) stated that elderly with higher education are generally those who used to have relatively high-income jobs and most of them also have security in their old age (especially elderly people who work in the formal sector) in their old age they no longer need to work because they can fulfill their needs without having to work.

Gender has a positive and significant relationship with the supply of labor for the elderly. The opportunity for the elderly with male gender to work is 2.42 times greater than that of women, meaning that men are more likely to continue working in retirement than women. This is because a man has duties and obligations as the backbone of the family compared to women. Based on these findings, it can be seen that the patriarchal culture is still rooted in that men are responsible for household needs as well as the main breadwinner. This finding is in line with the results of research by Adioetomo et al (2018).

Household status has a positive and significant relationship with the supply of elderly workers. The chances of the elderly who become head of household work are 2.09 times greater than those who are not head of household. This means that the elderly who have the status of the head of the household has a greater probability of working in the elderly, while the elderly who are members of the household tend not to work. This is because the elderly who have the status of the head of the household has a role and responsibility in fulfilling the needs of their family life, this also indicates a family dependency which encourages the elderly population as head of household to continue working in old age.

Health status has a positive and significant relationship with elderly job offers. The healthy elderly population tends to work 7.89 times greater than the elderly who experience health complaints, so this means that the elderly population who have relatively good health conditions have a greater probability and the tendency to work in old age. On the other hand, the elderly population with declining and relatively poor health conditions have the probability of not working in their old age. This is because, with their declining health condition in old age, the elderly population chooses to withdraw from the labor market with conditions that no longer allow them to continue working. The aging process causes the body's immune system to decrease so that chronic diseases are easily affected in the elderly. The ability and physical condition of the elderly as a result of the aging process they experience will affect decreasing their productivity so that they tend to leave the labor market.

The area of residence has a negative and significant relationship to the supply of labor for the elderly, meaning that the elderly who live in urban areas will be less likely to work than those who live in rural areas. The opportunity for the elderly who live in urban areas to work is 0.62 times less than those who live in rural areas, so this means that the elderly who live in urban areas have a greater probability for the elderly population not to work. This is based on several factors such as different job characteristics between rural and urban areas, different cultures, and the presence or absence of pension policies in rural and urban areas which affect the tendency of the elderly population to work or not work. This finding is reinforced by the results of research in China,

Giles et al (2011) found that elderly residents in rural areas have a tendency to continue working in old age, namely throughout their life span compared to urban elderly residents who are mostly highly educated, accumulated relatively high wealth, and type of work that sets the normal limit for the retirement age for not working in old age.

CONCLUSION

Based on the results of the binary logistic regression analysis, the variables that were simultaneously found to have a significant effect on the elderly labor supply model in NTB were age, education level, gender, the status of the head of the household, and the area of residence. In addition, it was also found that variables that had a positive relationship with the supply of elderly workers were age, gender, household status, and health status. Meanwhile, the variables that have a negative slope are the variables of education level and area of residence. In general, the variable that has the biggest influence on the elderly labor supply model in NTB is the health status variable.

This study only analyzes the supply of elderly labor based on variables of age, education level, gender, the status of the head of the household, marital status, and area of residence. For the next research, it may be possible to add a wage variable that can be proxied by the regional minimum wage and consider new variables such as the number of household members covered and ownership of pension funds or old-age insurance. Another limitation is using cross-sectional data so that this study can only explain the phenomena that occur related to the employment conditions of the elderly at one point in time, 2017. It would be better if you use panel data so that you can see the pattern of the development of the elderly's welfare over time and can be analyzed in more depth.

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